

What is claimed is:

1. A case for confining a circuit card to a particular location within a housing, the case comprising:
 - a slot; and
 - an actuator disposed within the slot, the actuator engageable with the circuit card for clamping the circuit card between the actuator and the case.
2. The case of claim 1, wherein the actuator is one of a wedge, cam, and resilient element.
3. The case of claim 1, wherein the circuit card is in slidable contact with the case.
4. The case of claim 1, wherein the case is thermally coupled to the housing.
5. The case of claim 1, wherein a heat sink is disposed between the case and the housing.
6. The case of claim 1, wherein the circuit card comprises a pair of circuit cards and a partition sandwiched therebetween and the actuator is engageable with one of the circuit cards.
7. A case for confining a pair of circuit cards to different locations within a housing, the case comprising:
 - a pair of opposing side walls and first and second end walls;

a partition disposed between the first and second end walls that divides the case into a first slot bounded by a portion of each of the side walls, the partition, and the first end wall and a second slot bounded by another portion of each of the side walls, the partition, and the second end wall, the first and second slots each containing one of the circuit cards; and

an actuator engageable with the circuit card in the first slot for clamping the circuit card in the first slot, the partition, and the circuit card in the second slot between the actuator and the second end wall.

8. The case of claim 7, wherein the actuator is one of a wedge, cam, and resilient element.

9. The case of claim 7, wherein the circuit cards are in slidable contact with each of the sidewalls.

10. The case of claim 7, wherein the partition is in slidable contact with each of the sidewalls.

11. The case of claim 7, wherein the second end wall is thermally coupled to the housing.

12. The case of claim 7, wherein a heat sink is disposed between the second end wall and the housing.

13. A case for confining at least one circuit card to a location within a housing, the case comprising:

- at least one slot that contains the at least one circuit card; and
- at least one cam selectively engageable with the at least one circuit card for clamping the circuit card between the cam and the case.
14. The case of claim 13, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.
15. The case of claim 13, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the at least one circuit card.
16. The case of claim 13, wherein the at least one cam is rotatably attached to the case.
17. The case of claim 13, wherein the at least one cam is disposed within the at least one slot.
18. The case of claim 13, wherein the at least one cam comprises a curved surface comprising serrations.
19. The case of claim 13, wherein the at least one slot comprises a pair of slots and the at least one circuit card comprises two circuit cards, each slot containing one of the circuit cards.

20. The case of claim 19, wherein the at least one cam is engageable with the one of the circuit cards for clamping the two circuit cards between the cam and the case.

21. The case of claim 13, wherein the case is thermally coupled to the housing.

22. The case of claim 13, wherein a heat sink is disposed between the case and the housing.

23. A case for confining at least one circuit card to a location within a housing, the case comprising:

at least one slot that contains the at least one circuit card; and

at least one cam disposed within the slot and rotatably attached to the case, the at least one cam selectively rotatable for selectively engaging the at least one circuit card for clamping the at least one circuit card between the at least one cam and the case.

24. The case of claim 23, wherein the at least one slot comprises a pair of slots and the at least one circuit card comprises two circuit cards, each slot containing one of the circuit cards.

25. The case of claim 24, wherein the at least one cam is engageable with the one of the circuit cards for clamping the two circuit cards between the cam and the case.

26. The case of claim 23, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, and two tandem pairs of cams.

27. The case of claim 23, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the at least one circuit card.

28. The case of claim 23, wherein the case is thermally coupled to the housing.

29. The case of claim 23, wherein a heat sink is disposed between the case and the housing.

30. A case for confining a pair of circuit cards to different locations within a housing, the case comprising:

a pair of opposing side walls and first and second end walls;

a partition disposed between the first and second end walls that divides the case into a first slot bounded by a portion of each of the side walls, the partition, and the first end wall and a second slot bounded by another portion of each of the side walls, the partition, and the second end wall, the first and second slots each containing one of the circuit cards; and

at least one cam disposed within the first slot and rotatably attached to the first end wall, the at least one cam selectively rotatable for selectively engaging the circuit card in the first slot for clamping the circuit card in the first slot, the partition, and the circuit card in the second slot between the at least one cam and the second end wall.

31. The case of claim 30, wherein the at least one cam is selected from the group consisting of a pair of cams in tandem, a pair of cams, or two tandem pairs of cams.

32. The case of claim 30, wherein the at least one cam is disposed on a shaft that rotates the at least one cam into and out of engagement with the at least one circuit card.

33. The case of claim 30, wherein the circuit cards are in slidable contact with each of the sidewalls.

34. The case of claim 30, wherein the partition is in slidable contact with each of the sidewalls.

35. The case of claim 30, wherein the second end wall is thermally coupled to the housing.

36. The case of claim 30, wherein a heat sink is disposed between the second end wall and the housing.

37. A case for confining at least one circuit card to a location within a housing, the case comprising:

at least one slot that contains the at least one circuit card;

a shaft rotatably attached to the case, the shaft having a head at one end and a nut at an end of the shaft opposite the head; and

at least one resilient element disposed on the shaft between the head and the nut, the at least one resilient element axially compressible between the head and nut to bulge generally perpendicularly to the axial direction into engagement with the circuit card for clamping the circuit card between the at least one resilient element and the case.

38. The case of claim 37, wherein the at least one resilient element is a pair of resilient elements.

39. The case of claim 38, and further comprising a sleeve disposed within a bracket attached to the case, the sleeve in slidable contact with the bracket, the shaft passing through the sleeve such that the shaft is rotatable within the sleeve, the sleeve located between the respective resilient elements of the pair of resilient elements.

40. The case of claim 37, wherein the shaft is disposed within the at least one slot.

41. The case of claim 37, wherein the shaft is in threaded engagement with the nut.

42. The case of claim 37, wherein the nut is attached to the case.

43. The case of claim 41, wherein the shaft threads into the nut to axially compress the at least one resilient element.

44. The case of claim 37, wherein the at least one slot comprises a pair of slots and the at least one circuit card comprises two circuit cards, each slot containing one of the circuit cards.

45. The case of claim 44, wherein the at least one resilient element bulges generally perpendicularly to the axial direction into engagement with one of the circuit cards for clamping the two circuit cards between the at least one resilient element and the case.

46. The case of claim 44, wherein the case is thermally coupled to the housing.

47. The case of claim 44, wherein a heat sink is disposed between the case and the housing.

48. A case for confining at least one circuit card to a location within a housing, the case comprising:

at least one slot that contains the at least one circuit card;

a shaft having a head at one end;

a nut attached to the case and in threaded engagement with the shaft adjacent an end of the shaft opposite the head;

a sleeve disposed within a bracket attached to the case, the sleeve in slidable contact with the bracket, the shaft passing through the sleeve such that the shaft is rotatable within the sleeve;

first and second resilient elements disposed on the shaft respectively on either side of the sleeve and between the head and the nut;

the first resilient element axially compressible between the head and the sleeve and the second resilient element axially compressible between the sleeve and the nut to respectively bulge generally perpendicularly to the axial direction into engagement with the circuit card for clamping the circuit card between the first and second resilient elements and the case.

49. The case of claim 48, wherein the shaft threads into the nut to axially compress the first resilient element between the head and the sleeve and the second resilient element between the sleeve and the nut.

50. The case of claim 48, wherein the at least one slot comprises a pair of slots and the at least one circuit card comprises two circuit cards, each slot containing one of the circuit cards.

51. The case of claim 48, wherein the first and second resilient elements bulge generally perpendicularly to the axial direction into engagement with one of the circuit cards for clamping the two circuit cards between the first and second resilient elements and the case.

52. The case of claim 48, wherein the case is thermally coupled to the housing.

53. The case of claim 48, wherein a heat sink is disposed between the case and the housing.

54. A case for confining a pair of circuit cards to different locations within a housing, the case comprising:

SEARCHED SERIALIZED INDEXED FILED

a pair of opposing side walls and first and second end walls;

a partition disposed between the first and second end walls that divides the case into a first slot bounded by a portion of each of the side walls, the partition, and the first end wall and a second slot bounded by another portion of each of the side walls, the partition, and the second end wall, the first and second slots each containing one of the circuit cards;

a shaft rotatably attached to the case, the shaft having a head at one end and a nut at an end of the shaft opposite the head; and

at least one resilient element disposed on the shaft between the head and the nut, the at least one resilient element axially compressible between the head and nut to bulge generally perpendicularly to the axial direction into engagement with the circuit card in the first slot for clamping the circuit card in the first slot, the partition, and the circuit card in the second slot between the at least one resilient element and the second end wall.

55. The case of claim 54, wherein the at least one resilient element is a pair of resilient elements.

56. The case of claim 55, and further comprising a sleeve disposed within a bracket attached to the case, the sleeve in slidable contact with the bracket, the shaft passing through the sleeve such that the shaft is rotatable within the sleeve, the sleeve located between the respective resilient elements of the pair of resilient elements.

57. The case of claim 54, wherein the shaft is in threaded engagement with the nut.

58. The case of claim 54, wherein the nut is attached to the case.

59. The case of claim 57, wherein the shaft threads into the nut to axially compress the at least one resilient element.

60. The case of claim 54, wherein the circuit cards are in slidable contact with each of the sidewalls.

61. The case of claim 54, wherein the partition is in slidable contact with each of the sidewalls.

62. The case of claim 54, wherein the second end wall is thermally coupled to the housing.

63. The case of claim 54, wherein a heat sink is disposed between the second end wall and the housing.

64. A case for confining a pair of circuit cards to different locations within a housing, the case comprising:

a pair of opposing sidewalls and first and second end walls;

a partition disposed between the first and second end walls that divides the case into a first slot bounded by a portion of each of the side walls, the partition, and the first end wall and a second slot bounded by another portion of each of the side walls, the partition, and the second end wall, the first and second slots each containing one of the circuit cards;

a shaft having a head at one end;

a nut attached to the case and in threaded engagement with the shaft adjacent an end of the shaft opposite the head;

a sleeve disposed within a bracket attached to the case, the sleeve in
slidable contact with the bracket, the shaft passing through the sleeve such that
the shaft is rotatable within the sleeve;

first and second resilient elements disposed on the shaft respectively on
either side of the sleeve and between the head and the nut;

the first resilient element axially compressible between the head and the
sleeve and the second resilient element axially compressible between the sleeve
and the nut to respectively bulge generally perpendicularly to the axial direction
into engagement with the circuit card in the first slot for clamping the circuit
card in the first slot, the partition, and the circuit card in the second slot between
the first and second resilient elements and the second end wall.

65. The case of claim 64, wherein the shaft threads into the nut to axially
compress the first resilient element between the head and the sleeve and the second
resilient element between the sleeve and the nut.

66. A method for clamping a circuit card within a case, the method
comprising:

inserting a wedge between a first end wall of the case and the circuit card
so that the wedge engages the circuit card and the first end wall;

exerting a force on the circuit card using the wedge; and

securing the circuit card between the wedge and a second end wall of the
case that is opposite to the first wall by maintaining the force on the circuit card
using the wedge.

67. The method of claim 66, wherein exerting a force on the circuit card
using the wedge comprises exerting a force on the wedge.

68. The method of claim 66, and further comprising sliding the circuit card into contact with the second end wall using the force exerted on the circuit card.

69. The method of claim 68, wherein sliding the circuit card into contact with the second end wall removes a gap between the second end wall and the circuit card.

70. A method for clamping a circuit card within a case, the method comprising:

inserting a wedge between a first end wall of the case and the circuit card so that the wedge engages the circuit card and the first end wall;

exerting a force on the circuit card using the wedge;

sliding the circuit card into contact with the second wall using the force; and

securing the circuit card between the wedge and the second end wall by maintaining the force on the circuit card using the wedge.

71. The method of claim 70, wherein exerting a force on the circuit card using the wedge comprises exerting a force on the wedge.

72. The method of claim 70, wherein sliding the circuit card into contact with the second end wall removes a gap between the second end wall and the circuit card.

73. A method for clamping first and second circuit cards within a case, the method comprising:

8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78

inserting a wedge between a first end wall of the case and the first circuit card so that the wedge engages the first circuit card and the first end wall;

exerting a force on the first circuit card using the wedge;

exerting a force on a partition disposed between the first and second circuit cards using the first circuit card;

exerting a force on the second circuit card using the partition; and

securing the first circuit card, the partition, and the second circuit card between the wedge and a second end wall of the case that is opposite to the first wall by maintaining the force on the first circuit card using the wedge.

74. The method of claim 73, wherein exerting a force on the first circuit card using the wedge comprises exerting a force on the wedge.

75. The method of claim 73, and further comprising sliding the first circuit card into contact with the partition using the force exerted on the first circuit card by the wedge.

76. The method of claim 75, wherein sliding the first circuit card into contact with the partition removes a gap between the first circuit card and the partition.

77. The method of claim 73, and further comprising sliding the partition into contact with the second circuit card using the force exerted on the partition by first circuit card.

78. The method of claim 77, wherein sliding the partition into contact with the second circuit card removes a gap between the partition and the second circuit card.

79. The method of claim 73, and further comprising sliding the second circuit card into contact with the second end wall using the force exerted on the second circuit card by the partition.

80. The method of claim 79, wherein sliding the second circuit card into contact with the second end wall removes a gap between the second circuit card and the second end wall.

81. A method for clamping first and second circuit cards within a case, the method comprising:

- inserting a wedge between a first end wall of the case and the first circuit card so that the wedge engages the first circuit card and the first end wall;
- exerting a force on the first circuit card using the wedge;
- sliding the first circuit card into contact with the partition using the force exerted on the first circuit card by the wedge;
- exerting a force on a partition disposed between the first and second circuit cards using the first circuit card;
- sliding the partition into contact with the second circuit card using the force exerted on the partition by first circuit card;
- exerting a force on the second circuit card using the partition;
- sliding the second circuit card into contact with the second end wall using the force exerted on the second circuit card by the partition; and
- securing the first circuit card, the partition, and the second circuit card between the wedge and a second end wall of the case that is opposite to the first wall by maintaining the force on the first circuit card using the wedge.

82. The method of claim 81, wherein exerting a force on the circuit card using the wedge comprises exerting a force on the wedge.

83. The method of claim 81, wherein sliding the first circuit card into contact with the partition removes a gap between the first circuit card and the partition.

84. The method of claim 81, wherein sliding the partition into contact with the second circuit card removes a gap between the partition and the second circuit card.

85. The method of claim 81, wherein sliding the second circuit card into contact with the second end wall removes a gap between the second circuit card and the second end wall.

86. A method for clamping at least one circuit card within a case, the method comprising:

exerting selectively a force on the at least one circuit card using at least one cam; and

maintaining the force on the at least one circuit card using the at least one cam.

87. The method of claim 86, and further comprising attaching the at least one cam rotatably to the case.

88. The method of claim 86, wherein exerting selectively a force on the at least one circuit card includes selectively rotating the at least one cam into engagement with the at least one circuit card.

9
8
7
6
5
4
3
2
1
0

89. The method of claim 88, wherein selectively rotating the at least one cam into engagement with the at least one circuit card comprises applying a torque to the cam.

90. The method of claim 86, and further comprising sliding the circuit card into contact with an end wall of the case using the force exerted on the circuit card.

91. The method of claim 90, wherein sliding the circuit card into contact with the end wall removes a gap between the end wall and the circuit card.

92. The method of claim 86, wherein ~~exerting selectively a force on the at least one circuit card includes exerting selectively a force on a pair of circuit cards.~~

93. The method of claim 92, wherein exerting selectively a force on a pair of circuit cards includes selectively rotating the at least one cam into engagement with one of the circuit cards so that the one of the circuit cards exerts a force on a partition disposed between the respective circuit cards, and the partition exerts a force on the other of the circuit cards.

94. The method of claim 87, wherein attaching the at least one cam rotatably to the case includes selecting the at least one cam from the group consisting of a pair of cams, a tandem pair of cams, and two tandem pairs of cams.

95. A method for clamping at least one circuit card within a case, the method comprising:

attaching at least one cam rotatably to the case;

rotating selectively the cam to engage the at least one circuit card;
exerting a force on the at least one circuit card using the at least one cam;
and
securing the circuit card between the at least one cam and an end wall of
the case by maintaining the force on the circuit card using the at least one cam.

96. The method of claim 95, and further comprising sliding the circuit card into contact with the second end wall using the force exerted on the circuit card.

97. The method of claim 96, wherein sliding the circuit card into contact with the second end wall removes a gap between the second end wall and the circuit card.

98. A method for clamping first and second circuit cards within a case, comprising:

- attaching at least one cam rotatably to the case;
- rotating selectively the at least one cam to engage the first circuit card;
- exerting a force on the first circuit card using the at least one cam;
- exerting a force on a partition disposed between the first and second circuit cards using the first circuit card;
- exerting a force on the second circuit card using the partition; and
- securing the first circuit card, the partition, and the second circuit card between at least one cam and an end wall of the case by maintaining the force on the first circuit card using the at least one cam.

99. The method of claim 98, and further comprising sliding the first circuit card into contact with the partition using the force exerted on the first circuit card by the at least one cam.

100. The method of claim 99, wherein sliding the first circuit card into contact with the partition removes a gap between the first circuit card and the partition.

101. The method of claim 98, and further comprising sliding the partition into contact with the second circuit card using the force exerted on the partition by first circuit card.

102. The method of claim 101, wherein sliding the partition into contact with the second circuit card removes a gap between the partition and the second circuit card.

103. The method of claim 98, and further comprising sliding the second circuit card into contact with the end wall using the force exerted on the second circuit card by the partition.

104. The method of claim 103, wherein sliding the second circuit card into contact with the end wall removes a gap between the second circuit card and the end wall.

105. The method of claim 98, wherein attaching the at least one cam rotatably to the case includes selecting the at least one cam from the group consisting of a pair of cams, a tandem pair of cams, or two tandem pairs of cams.

106. A method for clamping at least one circuit card within a case, the method comprising:

compressing axially at least one resilient element between a head of a shaft and a nut disposed on the shaft so that the at least one resilient element bulges generally perpendicularly to the axial direction and into engagement with the at least one circuit card;

exerting a force on the at least one circuit card using the at least one resilient element; and

maintaining the force on the at least one circuit card using the at least one resilient element.

107. The method of claim 106, and further comprising attaching rotatably the shaft to the case.

~~107~~

108. The method of claim 106, wherein compressing axially at least one resilient element comprises compressing axially a pair of resilient elements between the head of the shaft and the nut.

109. The method of claim 108, wherein compressing axially a pair of resilient elements between the head of the shaft and the nut comprises compressing one of the resilient elements between the head and a sleeve and compressing the other resilient element between the sleeve and the nut.

110. The method of claim 106, wherein compressing axially at least one resilient element comprises threading the shaft into the nut.

111. The method of claim 101, wherein attaching rotatably the shaft to the case comprises attaching the nut to the case.

112. The method of claim 106, and further comprising sliding the circuit card into contact with an end wall of the case using the force exerted on the circuit card.

113. The method of claim 112, wherein sliding the circuit card into contact with the end wall removes a gap between the end wall and the circuit card.

114. The method of claim 106, wherein exerting a force on the at least one circuit card includes exerting a force on a pair of circuit cards.

115. The method of claim 114, wherein exerting a force on a pair of circuit cards comprises the at least one resilient element bulging into engagement with one of the circuit cards so that the one of the circuit cards exerts a force on a partition disposed between the respective circuit cards, and the partition exerts a force on the other of the circuit cards.

116. A method for clamping at least one circuit card within a case, the method comprising:

compressing axially at least one resilient element between a head of a shaft and a nut disposed on the shaft so that the at least one resilient element bulges generally perpendicularly to the axial direction and into engagement with the at least one circuit card;

exerting a force on the at least one circuit card using the at least one resilient element; and

securing the circuit card between the at least one resilient element and an end wall of the case by maintaining the force on the circuit card using the at least one resilient element.

117. The method of claim 116, and further comprising attaching rotatably the shaft to the case.

118. The method of claim 116, wherein compressing axially at least one resilient element comprises compressing axially a pair of resilient elements between the head of the shaft and the nut.

119. The method of claim 118, wherein compressing axially a pair of resilient elements between the head of the shaft and the nut comprises compressing one of the resilient elements between the head and a sleeve and compressing the other resilient element between the sleeve and the nut.

120. The method of claim 116, wherein compressing axially at least one resilient element comprises threading the shaft into the nut.

121. The method of claim 117, attaching rotatably the shaft to the case comprises attaching the nut to the case.

122. The method of claim 116, and further comprising sliding the circuit card into contact with the end wall using the force exerted on the circuit card.

123. The method of claim 122, wherein sliding the circuit card into contact with the end wall removes a gap between the second end wall and the circuit card.

124. A method for clamping first and second circuit cards within a case, the method comprising:

compressing axially at least one resilient element between a head of a shaft and a nut disposed on the shaft so that the at least one resilient element bulges generally perpendicularly to the axial direction and into engagement with the first circuit card;

exerting a force on the first circuit card using the at least one resilient element;

exerting a force on a partition disposed between the first and second circuit cards using the first circuit card;

exerting a force on the second circuit card using the partition; and

securing the first circuit card, the partition, and the second circuit card between at least one resilient element and an end wall of the case by maintaining the force on the first circuit card using the at least one resilient element.

125. The method of claim 124, and further comprising attaching rotatably the shaft to the case.

126. The method of claim 124, wherein compressing axially at least one resilient element comprises compressing axially a pair of resilient elements between the head of the shaft and the nut.

127. The method of claim 126, wherein compressing axially a pair of resilient elements between the head of the shaft and the nut comprises compressing one of the

resilient elements between the head and a sleeve and compressing the other resilient element between the sleeve and the nut.

128. The method of claim 124, wherein compressing axially at least one resilient element comprises threading the shaft into the nut.

129. The method of claim 125, wherein attaching rotatably the shaft to the case comprises attaching the nut to the case.

130. The method of claim 124, and further comprising sliding the first circuit card into contact with the partition using the force exerted on the first circuit card by the at least one resilient element.

131. The method of claim 130, wherein sliding the first circuit card into contact with the partition removes a gap between the first circuit card and the partition.

132. The method of claim 124, and further comprising sliding the partition into contact with the second circuit card using the force exerted on the partition by first circuit card.

133. The method of claim 132, wherein sliding the partition into contact with the second circuit card removes a gap between the partition and the second circuit card.

134. The method of claim 124, and further comprising sliding the second circuit card into contact with the end wall using the force exerted on the second circuit card by the partition.

135. The method of claim 134, wherein sliding the second circuit card into contact with the end wall removes a gap between the second circuit card and the end wall.

100 204US01